

“Sketching in the Field for Geological and for Prospecting Work”

In Mines and Minerals, A Mining and Metallurgical Journal,
Vol. XXII, No. 11, June 1902, pp. 518

This article, which begins on the next page,
is presented on the Stone Quarries and Beyond web site.

<http://quarriesandbeyond.org/>

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November 2013

downwards, while the ribs *b* do not give; this causes a shear at the vertical lines, and finally the piece *a* falls. The next piece *c* will shear in time and fall, but it will not be so long a piece, as the projections from *a* support a portion of its length. This continues until an arch is formed, and distance between the ends of the slabs is so small no bending takes place. Such cases are to be observed in many places on the surface where water has undermined the rocks. To prevent such occurrences as the foregoing, it is usually customary in driving small tunnels in rock, or gangways in coal, to give the top less width than the bottom, and thus follow nature. A section of a tunnel of this description is shown in Fig. 5, but the arch may be even greater when driven in rock of the same character and not in coal beds as illustrated.

Sketching in the Field for Geological and for Prospecting Work.

There are two things to be considered in field sketching. The first is how to grow handy with the pencil, so as to be able to make a quick, rough, but intelligible sketch. Nearly all sketching in the mining field requires speed and haste rather than minuteness, great accuracy, or elaboration.

The next thing is to consider what are the kind of subjects we are most likely to come across in the mining, prospecting, engineering, and geological field to sketch.

With regard to the first, we do not propose to give a treatise on drawing or sketching; admirable treatises of this kind will be found in the little pamphlet books published by Windsor & Newton, and others to be found in any art store. Again, we do not propose to try to teach the art of freehand drawing, which is nowadays so ably taught in schools and classes. To such as have the advantage of these we have little to say beyond endeavoring to direct their energies in the special line adapted for the mining field. To the class of mostly grown-up people who would like to be able to use their pencil and make an intelligible sketch, we may have some suggestions and some encouragement to give. To become thoroughly handy with the pencil, the art should begin with childhood, and every father and mother should place a pencil, and later a brush, in the hands of their child as soon as he or she is able to hold them. Children take naturally to drawing and coloring, and all they need is a little encouragement and guidance.

To the children of a later growth, we would say, Try and draw, sketch! anything and everything. Have always a pad and pencil in your pocket and be always at it at all spare moments, like the oldtime backwoodsman at his whittling or the old lady at her knitting. Much can be done in this way without help. The best way to learn to ride is to jump on a horse bare-back and ride; to skate, is to put on skates and skate, not read treatises on skating. "Stay not on the order of your going, but go."

FREERHAND SKETCHING IN THE MINING FIELD.

One of the first, most important things, is to learn to see aright; the next is to draw what you see. To do this and observe how things you see should appear if delineated, a good plan is



ILLUSTRATION OF SHADING.

to trace on a window pane some simple object viewed from the window, such as a hill or a neighbor's house and fence; this will soon teach the simple principles of perspective, that "bogie" of beginners. It will show how lines below the eye, like the street and sidewalk, and receding from the eye like the far end of the street, point upwards towards a certain level which you will find by holding your pencil level with the eye, *is* the level of your eye,

whilst by pointing your pencil like a rifle direct from your eye on this level line, you will find out the so-called "point of sight" to which all parallel lines receding from you converge, both those above, below, and on the side of you. Learn this well, by means of tracing on the window pane some object of perspective like a house, railway, or street, and you will have mastered most of the perspective you are likely to meet with in the mining field. To confirm and strengthen your ideas by practice you may notice in your walks the convergence to a point of the lines of a

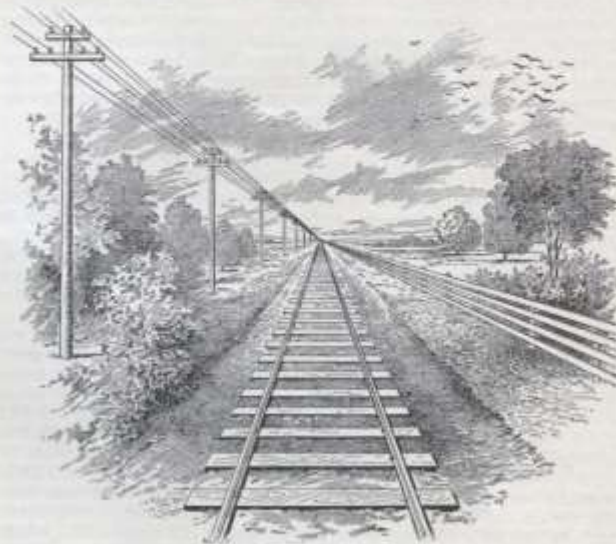


ILLUSTRATION OF PERSPECTIVE AND VANISHING POINT.

railway receding from you on a level plain into the far distance, like the illustration. You may note, too, how the telegraph wires along that line also come down to this same vanishing point, or point of sight. You may notice the same facts on an ordinary street, or even on the walls and ceiling of your own room. Outside of mine buildings, tunnels, and other simple problems of perspective, most of your sketching will lie in delineation of external form of natural things and in the study of relative proportion, such as drawing things at a distance smaller and more faintly than things as they approach nearer.

This, without going into a long dissertation on drawing, is as much as we can, in this limited space, afford to say to the beginner, and we would advise him for a time to let the window pane be his teacher. A little damp chalk or a brush dipped in water color will be found the best medium for tracing on window glass. With the drawing pad and pencil try to draw anything you fancy, but select at first very simple and well-defined things, or you may get discouraged. As regards shading, our work in the mine-sketching field is generally so rapid that we often have little time for shading, and the suggestion of shadow is often done more by a heavier or blacker line than by any other means. Mining sketching is more line sketching than anything else. Don't worry about perspective, or rules, or treatises, or mathematics, or geometry, or shading; these will come in their proper place if required in due time.

After practicing by yourself sometime, if you have a friend who knows how to draw, ask his help and criticism. Get him to draw some of the subjects you are trying and watch him. Always draw from *objects*. Avoid copying and copies for a long time; they have their uses later. Learn to ride a real horse; don't practice on a dummy or hobby horse. As regards speed in drawing or sketching, don't attempt it at first, but begin by slow and very careful and accurate work; aim at conscientious accuracy and speed will come afterwards. Gauge everything by your pencil held at arm's length from you. When you want to know how a receding line is acting perspective, compare it with your pencil held horizontally before your eyes; if the line you are looking at rises upwards, making an acute angle with the underpart of your horizontal pencil, it is below the level of your eye, and draw it accordingly. If it descends downward towards your pencil, it is above the level of your eye. If an outline is curved, compare it with your straight pencil, and you will see the amount of curvature. Never mind how you sit to draw, or whether your arm is this way or that. In the field you may have to draw on the back of a mule. Avoid stiffness, be free and easy and natural, or you will never learn to draw at all.